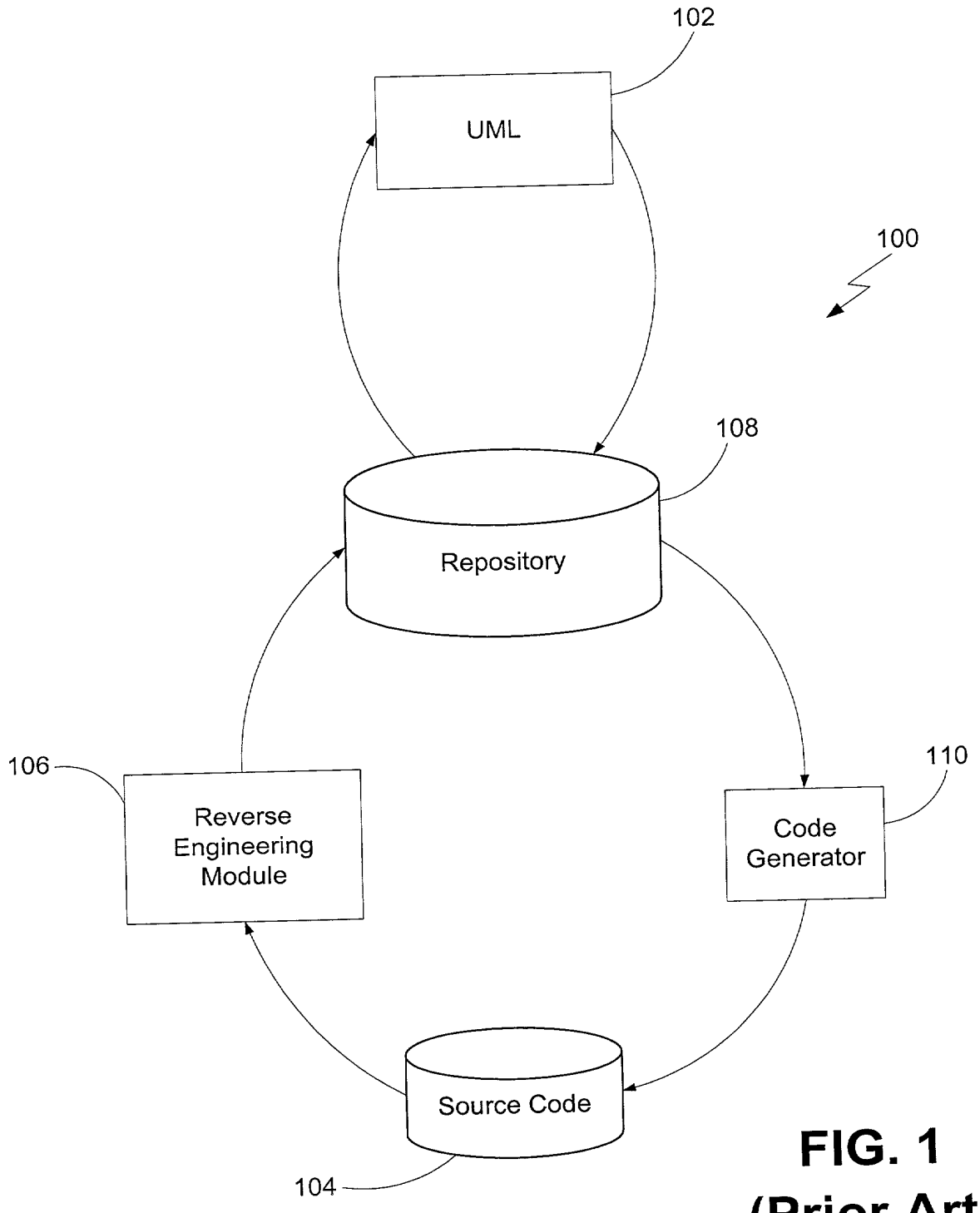


FIG. 1
(Prior Art)

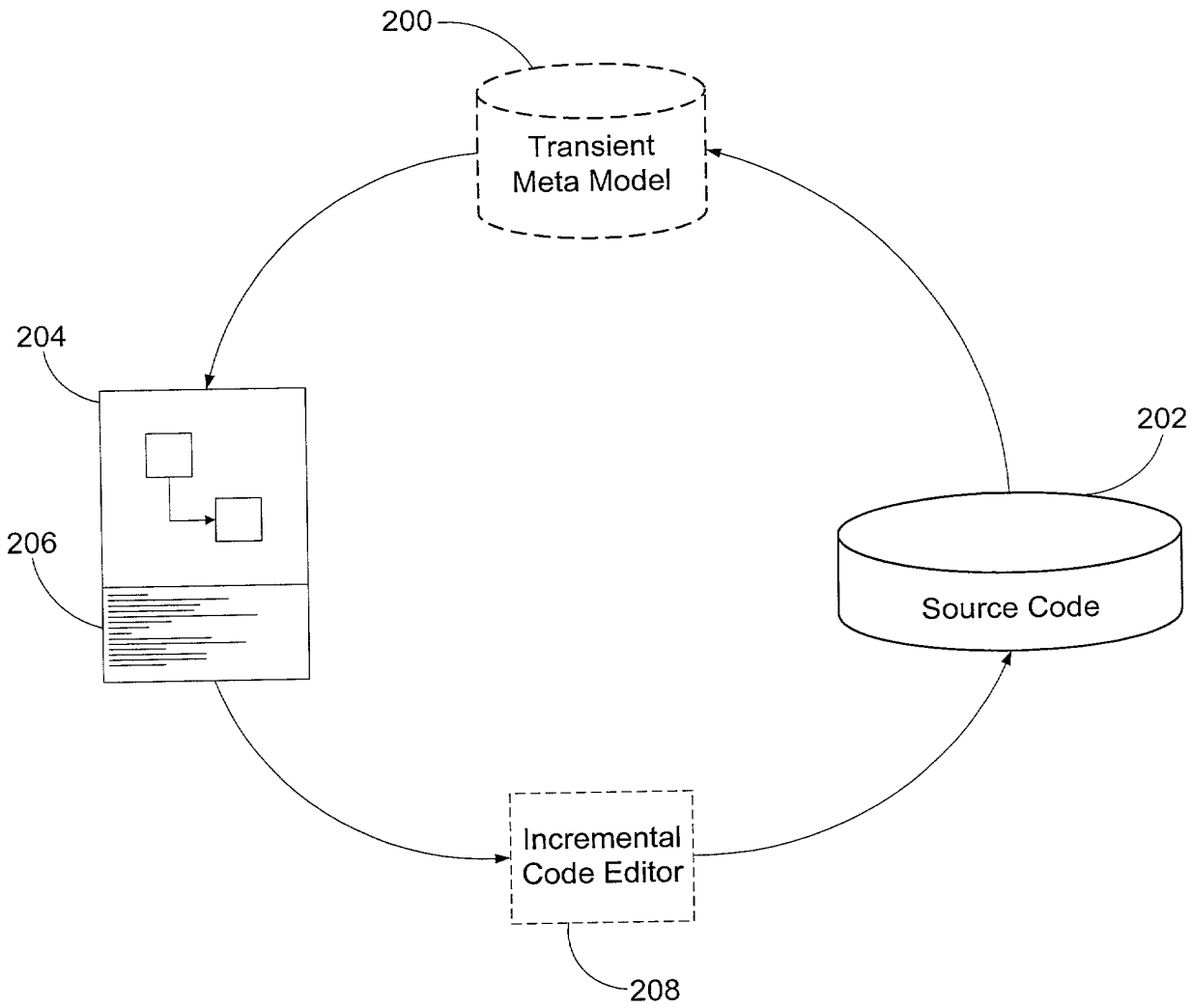

200
Transient
Meta Model
204
206
202
Source Code
Incremental
Code Editor
208

FIG. 2

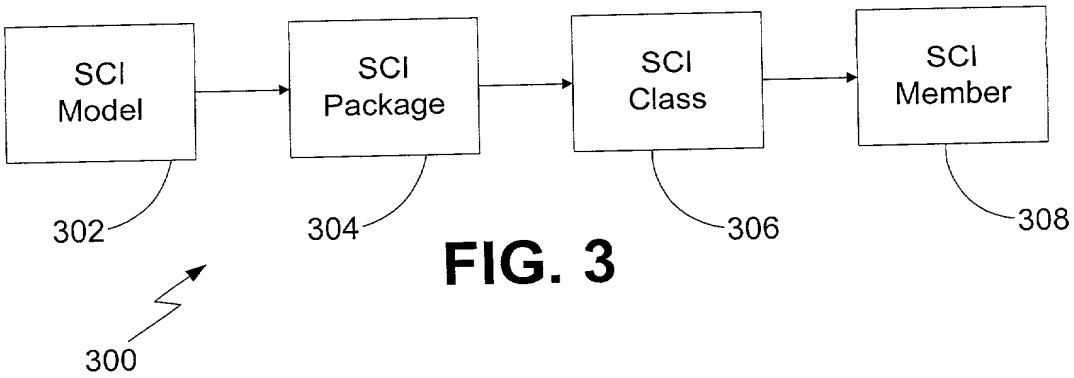


FIG. 3

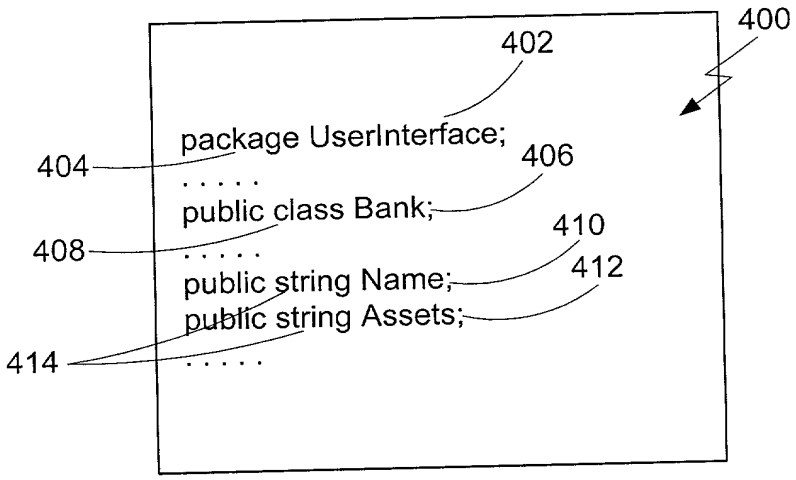


FIG. 4

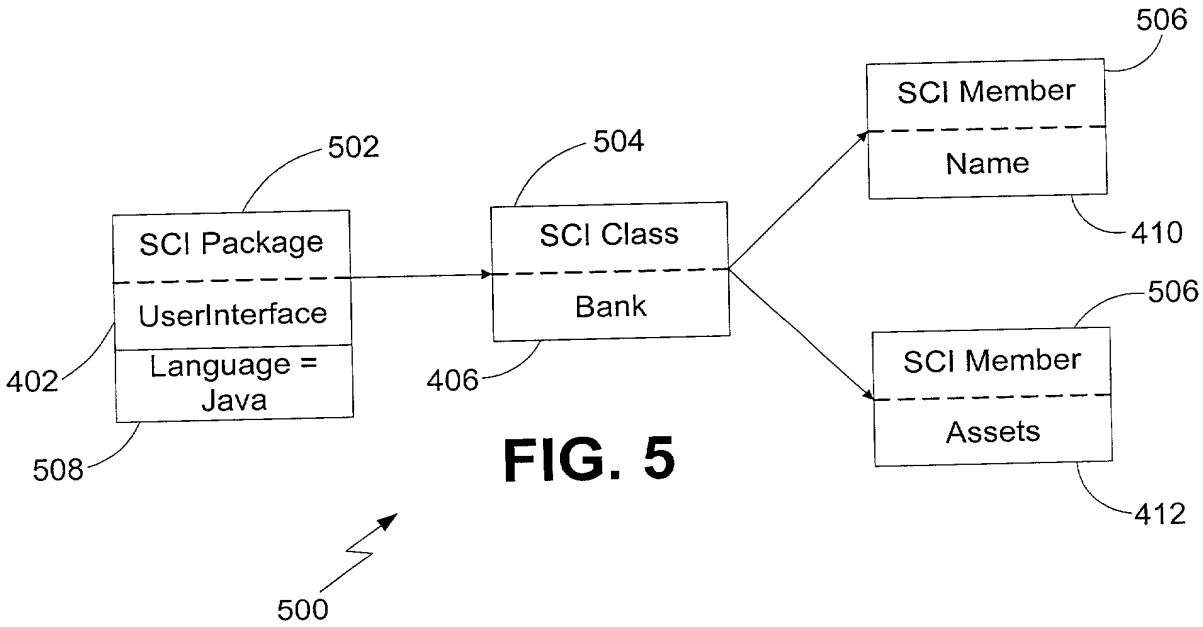


FIG. 5

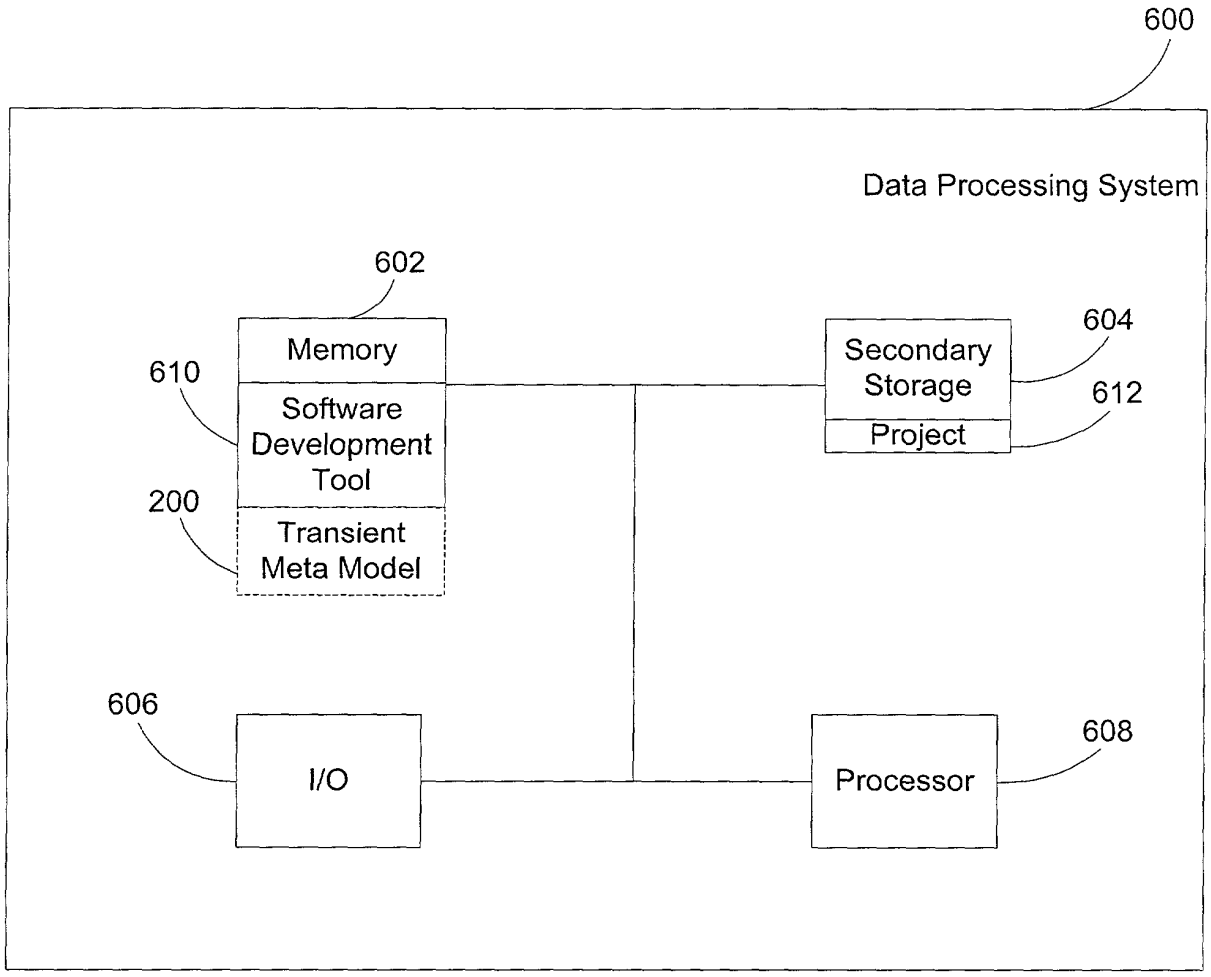

600
Data Processing System
602
Memory
610
Software Development Tool
200
Transient Meta Model
604
Secondary Storage
612
Project
606
I/O
608
Processor

FIG. 6

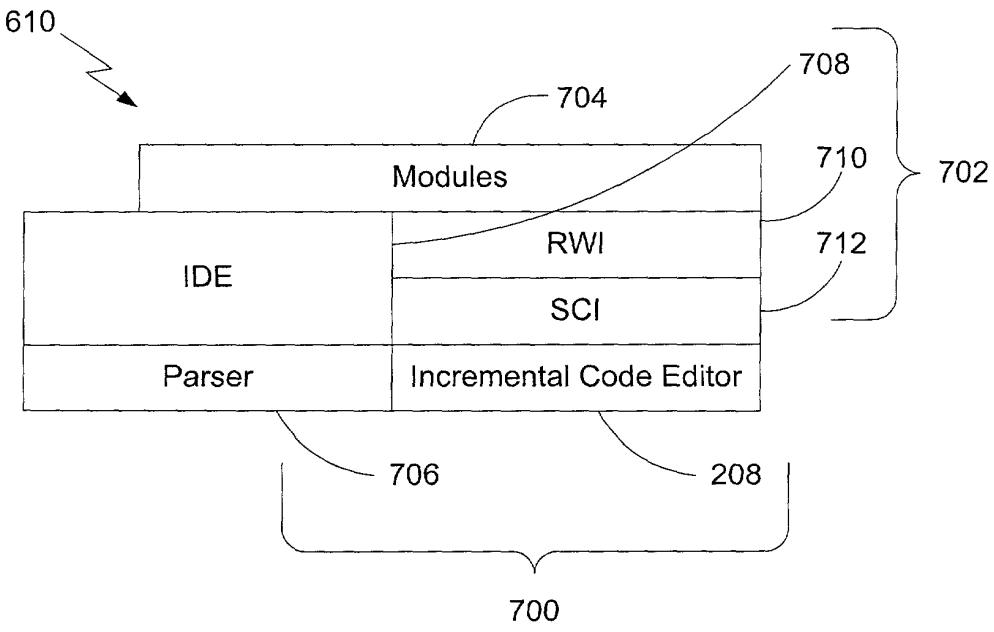

610
708
704
Modules
710
702
IDE
RWI
712
SCI
Parser
Incremental Code Editor
706
208
700

FIG. 7

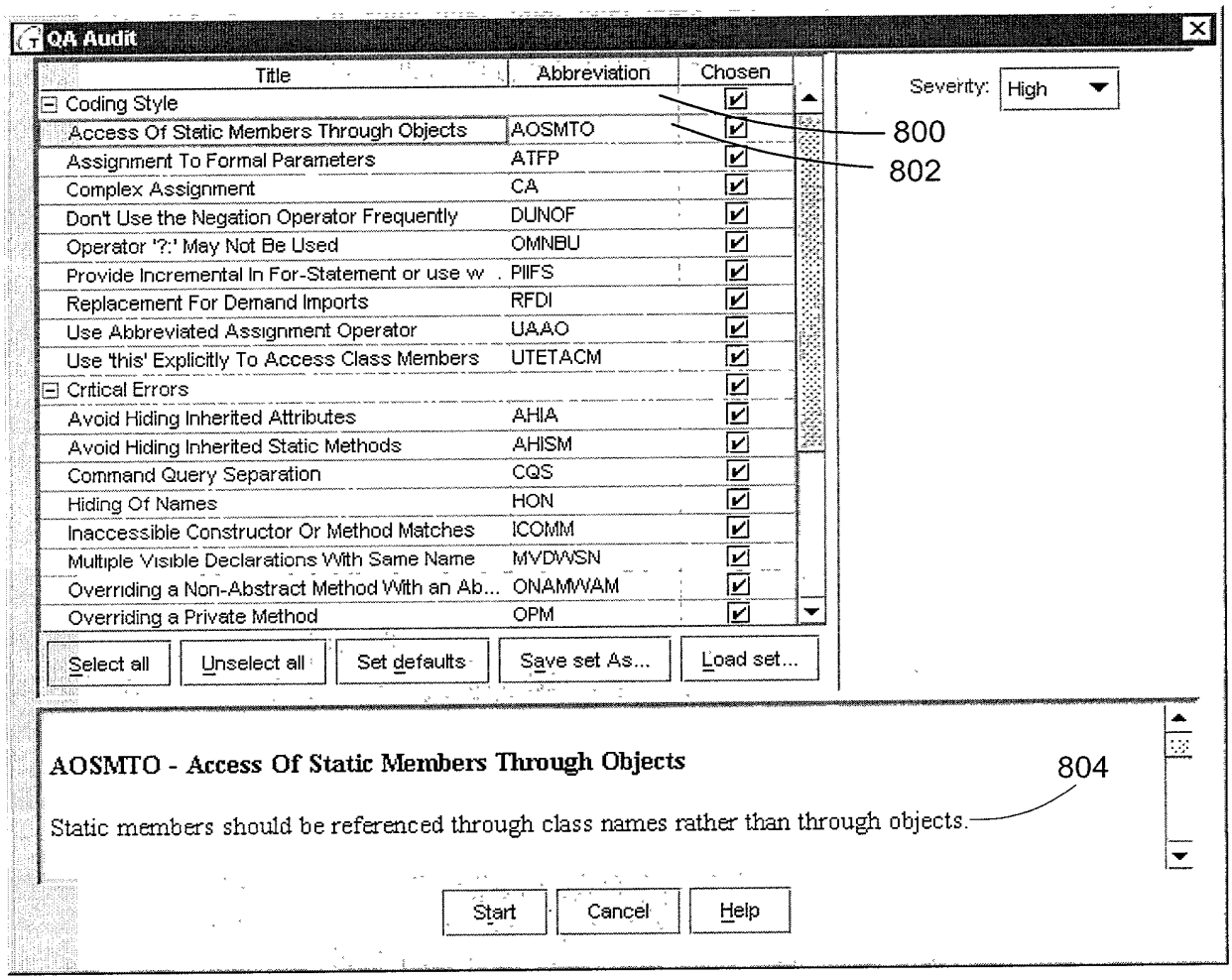

QA Audit
Title
Abbreviation
Chosen
Coding Style
Access Of Static Members Through Objects
AOSMTO
Assignment To Formal Parameters
ATFP
Complex Assignment
CA
Don't Use the Negation Operator Frequently
DUNOF
Operator '?:' May Not Be Used
OMNBU
Provide Incremental In For-Statement or use w
PIIFS
Replacement For Demand Imports
RFDI
Use Abbreviated Assignment Operator
UAAO
Use 'this' Explicitly To Access Class Members
UTETACM
Critical Errors
Avoid Hiding Inherited Attributes
AHIA
Avoid Hiding Inherited Static Methods
AHISM
Command Query Separation
CQS
Hiding Of Names
HON
Inaccessible Constructor Or Method Matches
ICOMM
Multiple Visible Declarations With Same Name
MVDWSN
Overriding a Non-Abstract Method With an Ab...
ONAMWAM
Overriding a Private Method
OPM
Severity:
High
800
802
Select all
Unselect all
Set defaults
Save set As...
Load set...
AOSMTO - Access Of Static Members Through Objects
804
Static members should be referenced through class names rather than through objects.
Start
Cancel
Help

FIG. 8A

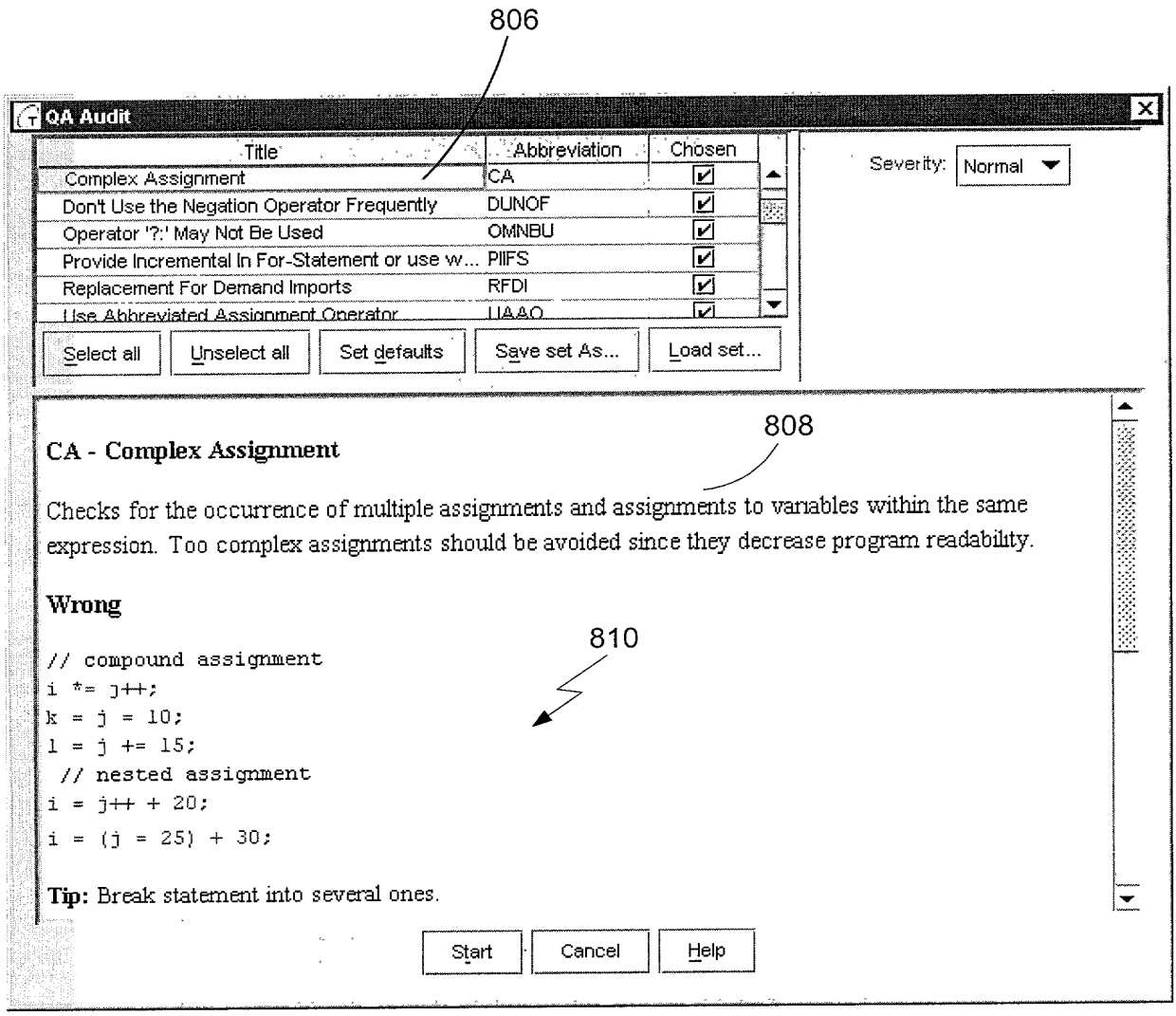

806
QA Audit
Title
Abbreviation
Chosen
Complex Assignment
CA
Don't Use the Negation Operator Frequently
DUNOF
Operator '?:' May Not Be Used
OMNBU
Provide Incremental In For-Statement or use w...
PIIFS
Replacement For Demand Imports
RFDI
Use Abbreviated Assignment Operator
UAAO
Severity:
Normal
Select all
Unselect all
Set defaults
Save set As...
Load set...
808
CA - Complex Assignment
Checks for the occurrence of multiple assignments and assignments to variables within the same expression. Too complex assignments should be avoided since they decrease program readability.
Wrong
810
// compound assignment
i *= j++;
k = j = 10;
l = j += 15;
// nested assignment
i = j++ + 20;
i = (j = 25) + 30;
Tip: Break statement into several ones.
Start
Cancel
Help

FIG. 8B

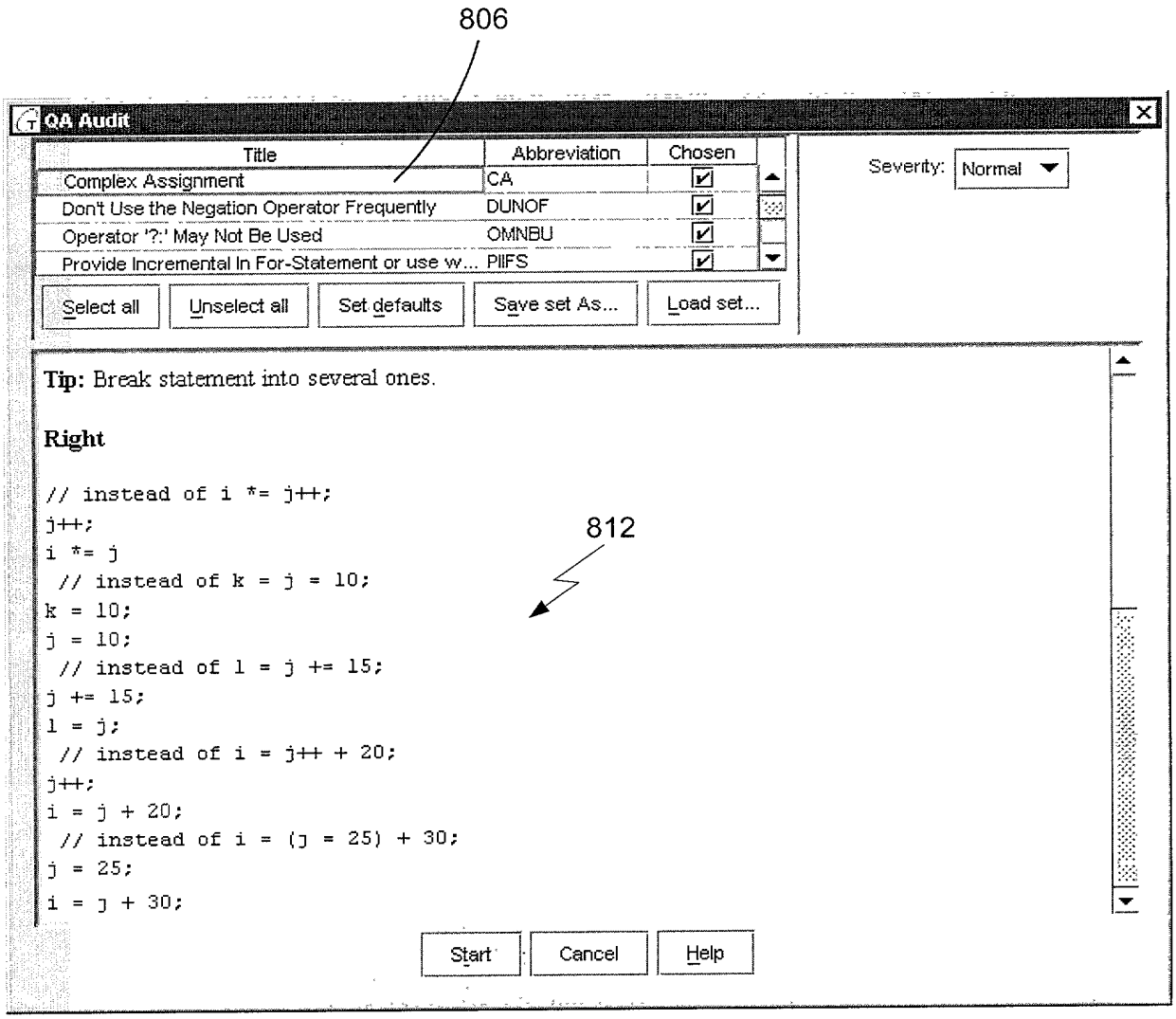

806
QA Audit
Title
Abbreviation
Chosen
Complex Assignment
CA
Don't Use the Negation Operator Frequently
DUNOF
Operator '?:' May Not Be Used
OMNBU
Provide Incremental In For-Statement or use w...
PIIFS
Severity:
Normal
Select all
Unselect all
Set defaults
Save set As...
Load set...
Tip: Break statement into several ones.
Right
// instead of i *= j++;
j++;
i *= j
// instead of k = j = 10;
k = 10;
j = 10;
// instead of l = j += 15;
j += 15;
l = j;
// instead of i = j++ + 20;
j++;
i = j + 20;
// instead of i = (j = 25) + 30;
j = 25;
i = j + 30;
812
Start
Cancel
Help

FIG. 8C

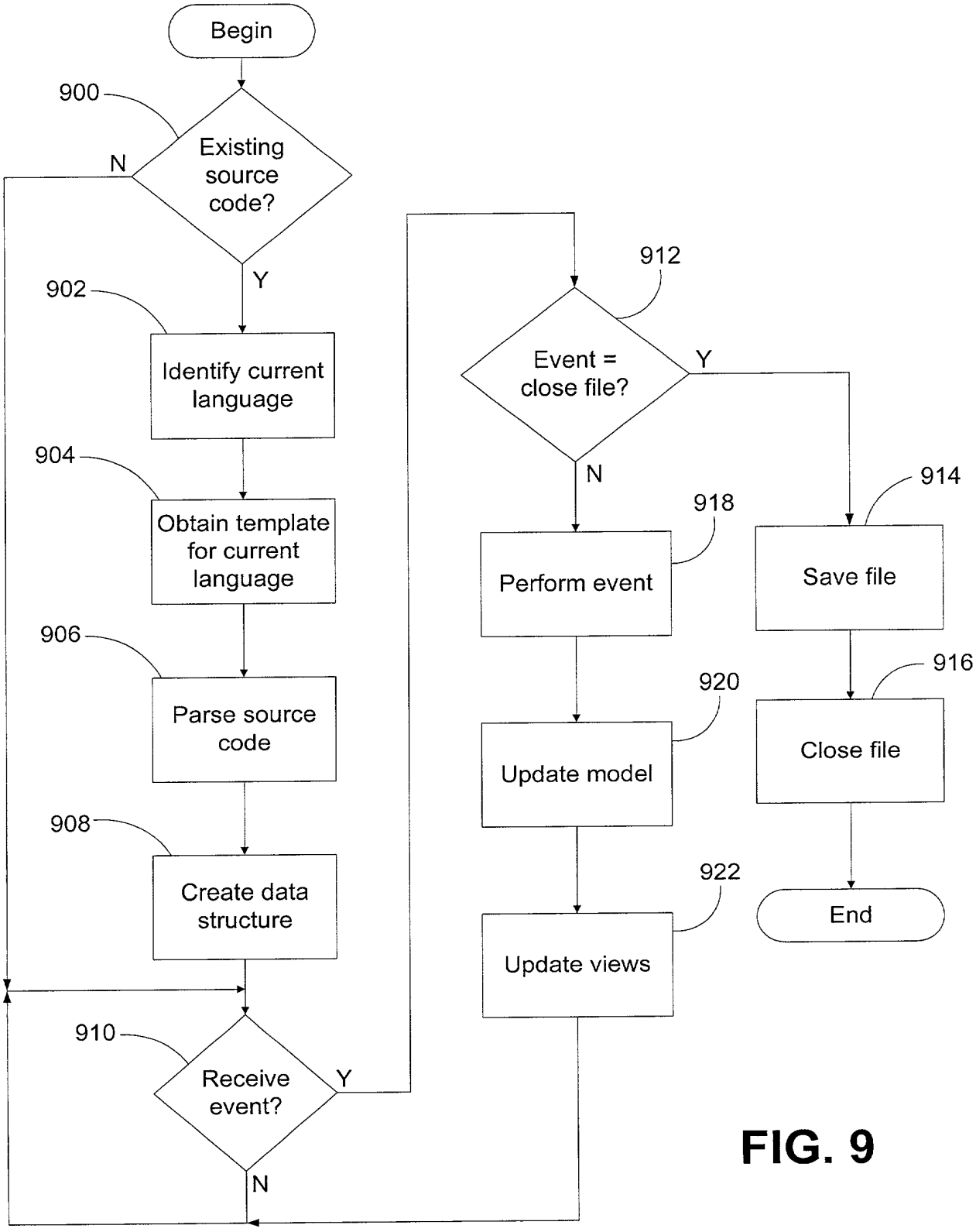

Begin
900
Existing source code?
N
Y
902
Identify current language
904
Obtain template for current language
906
Parse source code
908
Create data structure
910
Receive event?
Y
N
912
Event = close file?
Y
N
914
Save file
916
Close file
End
918
Perform event
920
Update model
922
Update views

FIG. 9

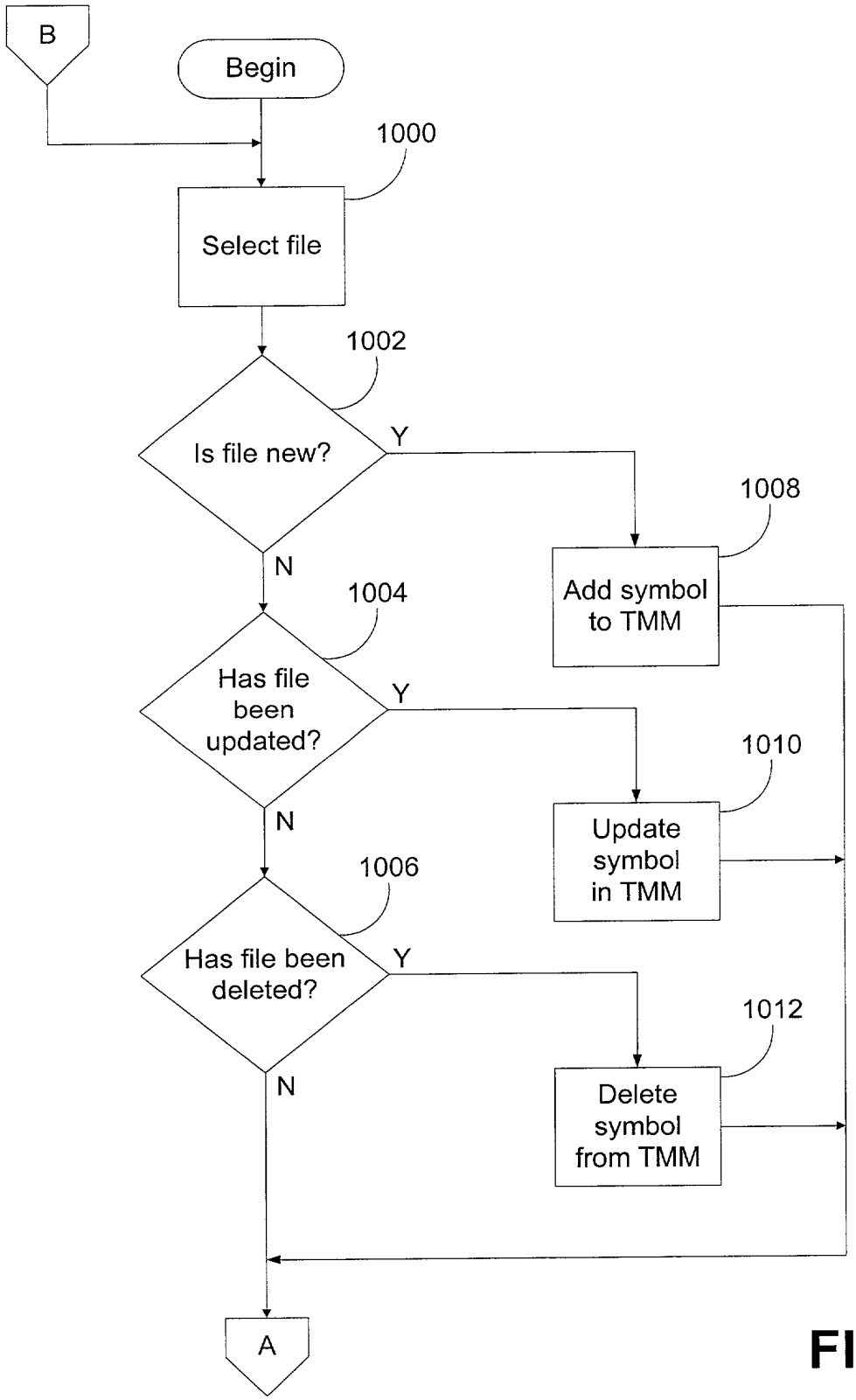

B
Begin
1000
Select file
1002
Is file new?
Y
N
1008
Add symbol to TMM
1004
Has file been updated?
Y
N
1010
Update symbol in TMM
1006
Has file been deleted?
Y
N
1012
Delete symbol from TMM
A

FIG. 10A

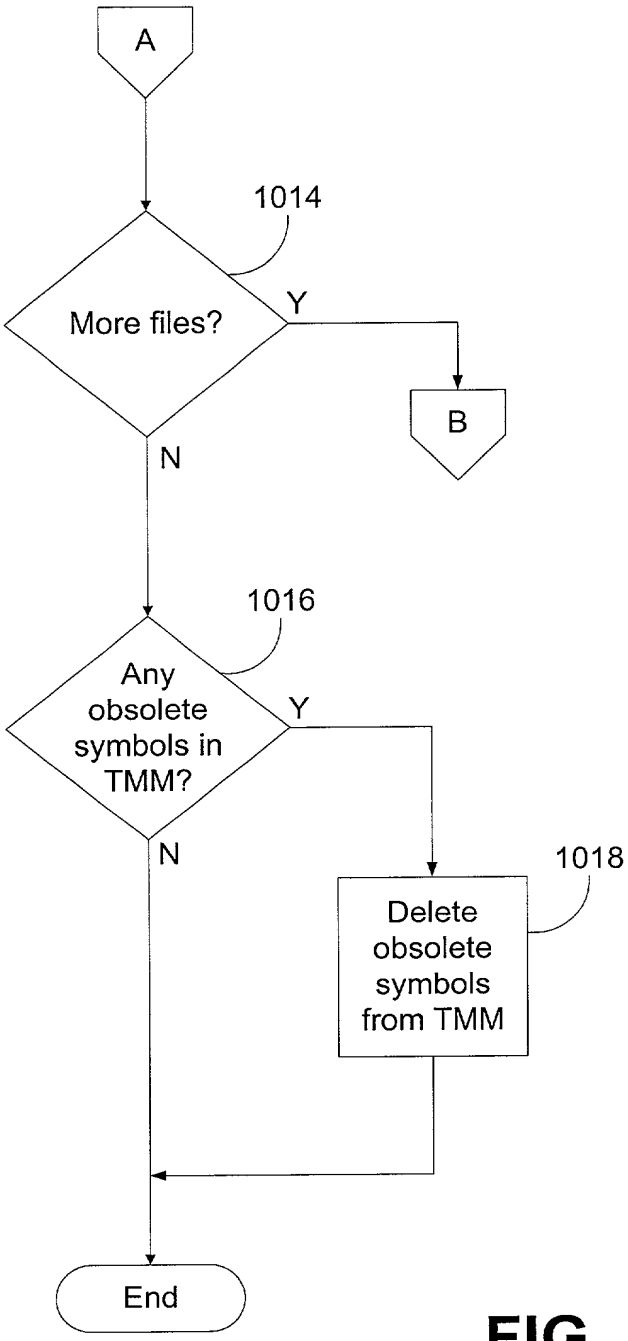

A
1014
More files?
Y
B
N
1016
Any obsolete symbols in TMM?
Y
N
1018
Delete obsolete symbols from TMM
End

FIG. 10B

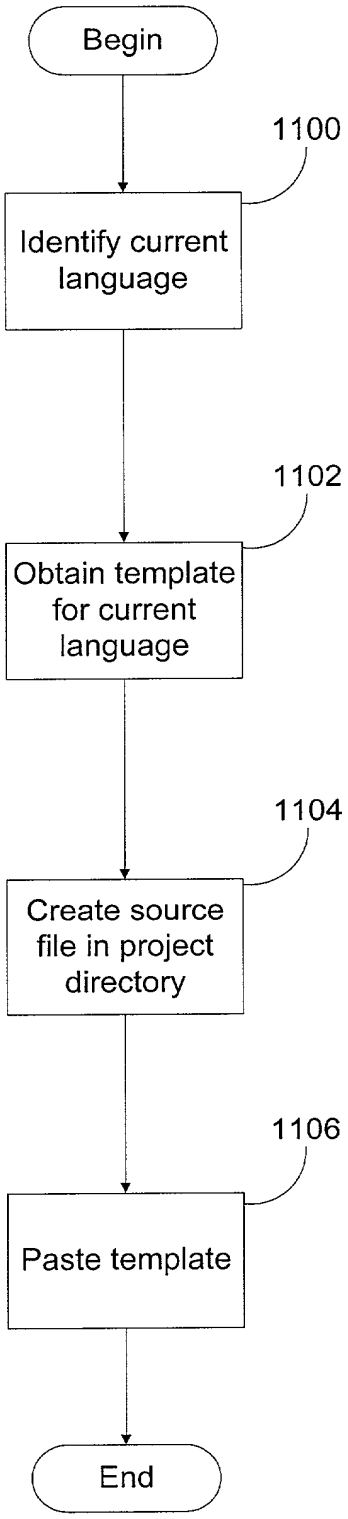

Begin
1100
Identify current language
1102
Obtain template for current language
1104
Create source file in project directory
1106
Paste template
End

FIG. 11

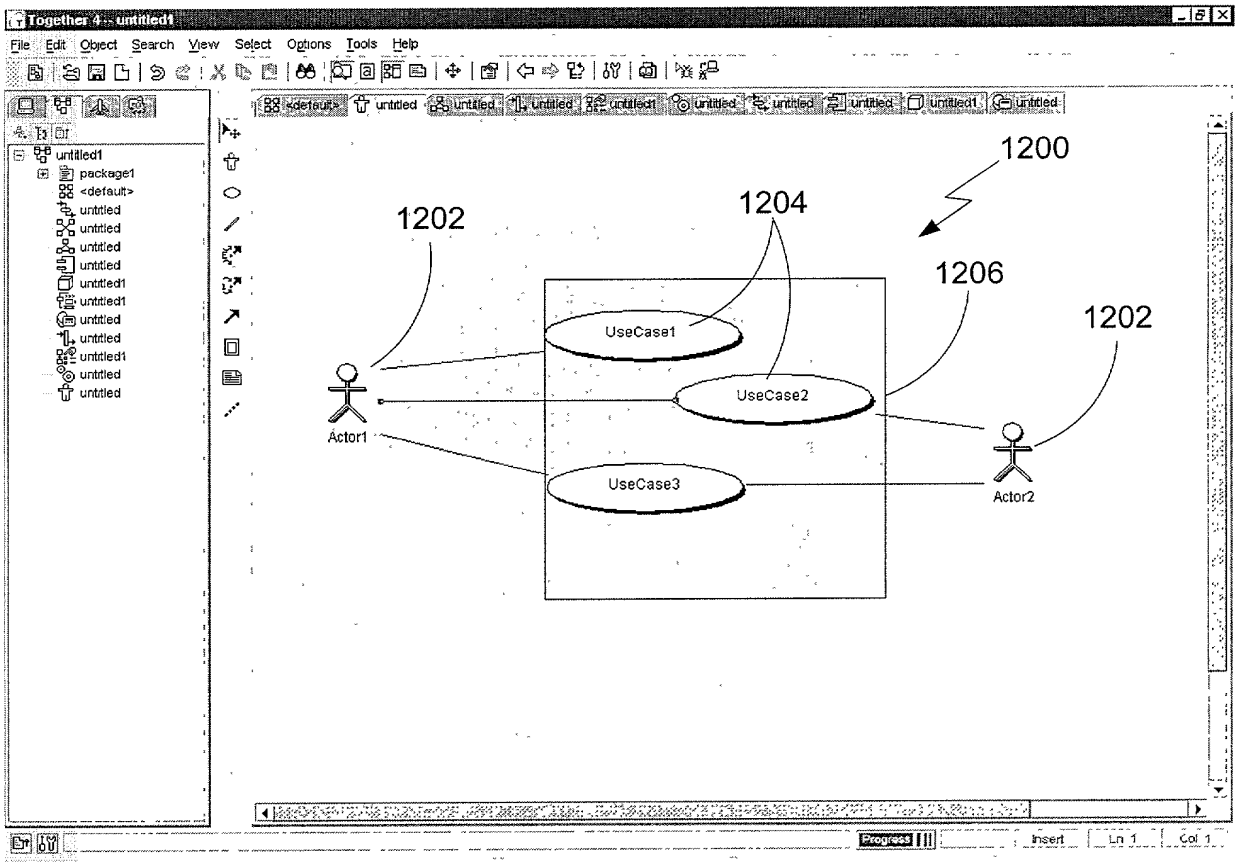

Together 4 - untitled1
File Edit Object Search View Select Options Tools Help
untitled1
package1
<default>
1200
1202
1204
1206
1202
UseCase1
UseCase2
UseCase3
Actor1
Actor2
Insert
Ln 1
Col 1

FIG. 12

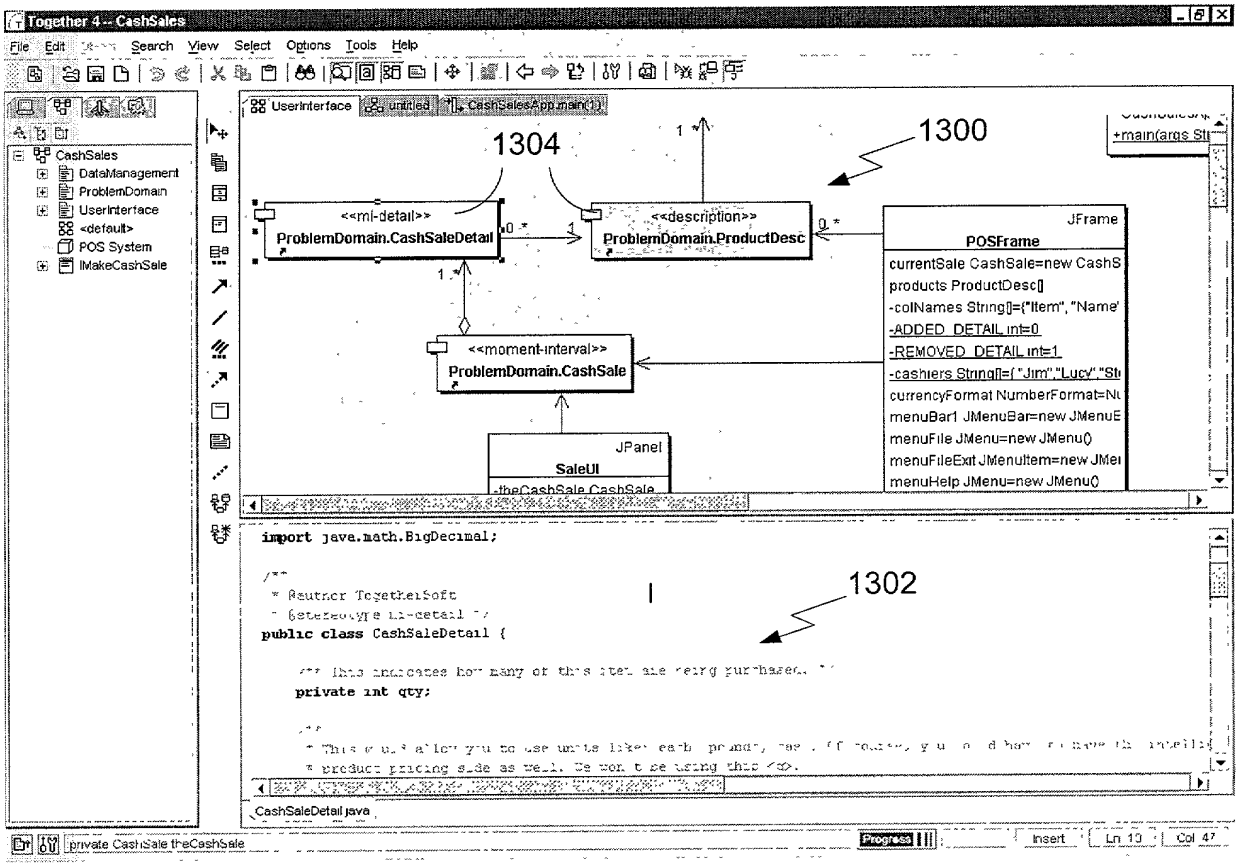

Together 4 -- CashSales
File Edit Search View Select Options Tools Help
CashSales
DataManagement
ProblemDomain
UserInterface
<default>
POS System
IMakeCashSale
UserInterface
untitled
CashSalesApp.main()
1304
1300
<<ml-detail>>
ProblemDomain.CashSaleDetail
<<description>>
ProblemDomain.ProductDesc
JFrame
POSFrame
currentSale CashSale=new CashS
products ProductDesc[]
-colNames String[]={"Item","Name"
-ADDED_DETAIL int=0
-REMOVED_DETAIL int=1
-cashiers String[]={"Jim","Lucy","St
currencyFormat NumberFormat=Nu
menuBar1 JMenuBar=new JMenuE
menuFile JMenu=new JMenu()
menuFileExit JMenuItem=new JMe
menuHelp JMenu=new JMenu()
<<moment-interval>>
ProblemDomain.CashSale
JPanel
SaleUI
-theCashSale CashSale
import java.math.BigDecimal;
1302
public class CashSaleDetail {
private int qty;
CashSaleDetail.java
private CashSale theCashSale
Insert
Ln 10
Col 47

FIG. 13

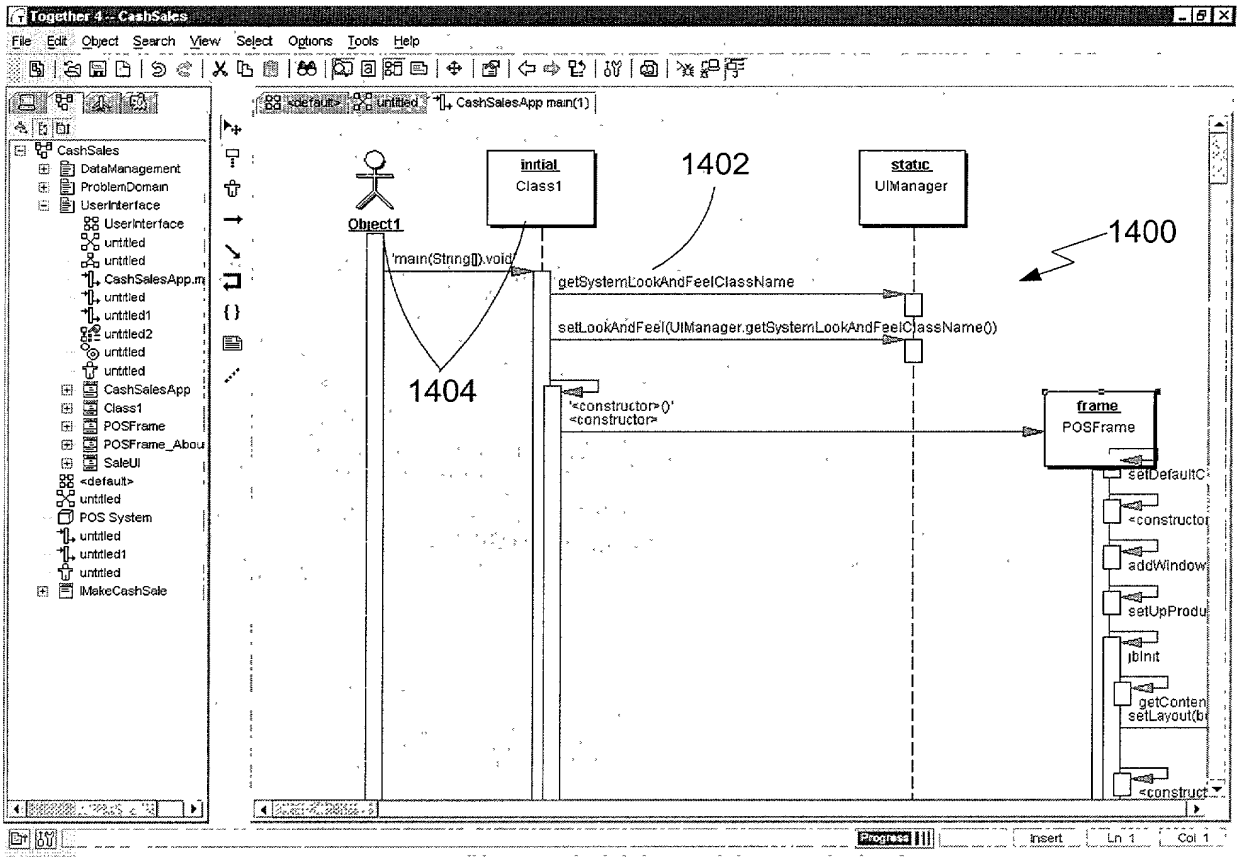

Together 4 - CashSales
File Edit Object Search View Select Options Tools Help
CashSales
DataManagement
ProblemDomain
UserInterface
UserInterface
untitled
untitled
CashSalesApp.m
untitled
untitled1
untitled2
untitled
untitled
CashSalesApp
Class1
POSFrame
POSFrame_Abou
SaleUI
<default>
untitled
POS System
untitled
untitled1
untitled
IMakeCashSale
<default>
untitled
CashSalesApp main(1)
Object1
initial
Class1
1402
static
UIManager
1400
'main(String[]):void'
getSystemLookAndFeelClassName
setLookAndFeel(UIManager.getSystemLookAndFeelClassName())
1404
'<constructor>()'
<constructor>
frame
POSFrame
setDefaultC
<constructor
addWindow
setUpProdu
jbInit
getConten
setLayout(b
<construct
Progress
Insert
Ln 1
Col 1

FIG. 14

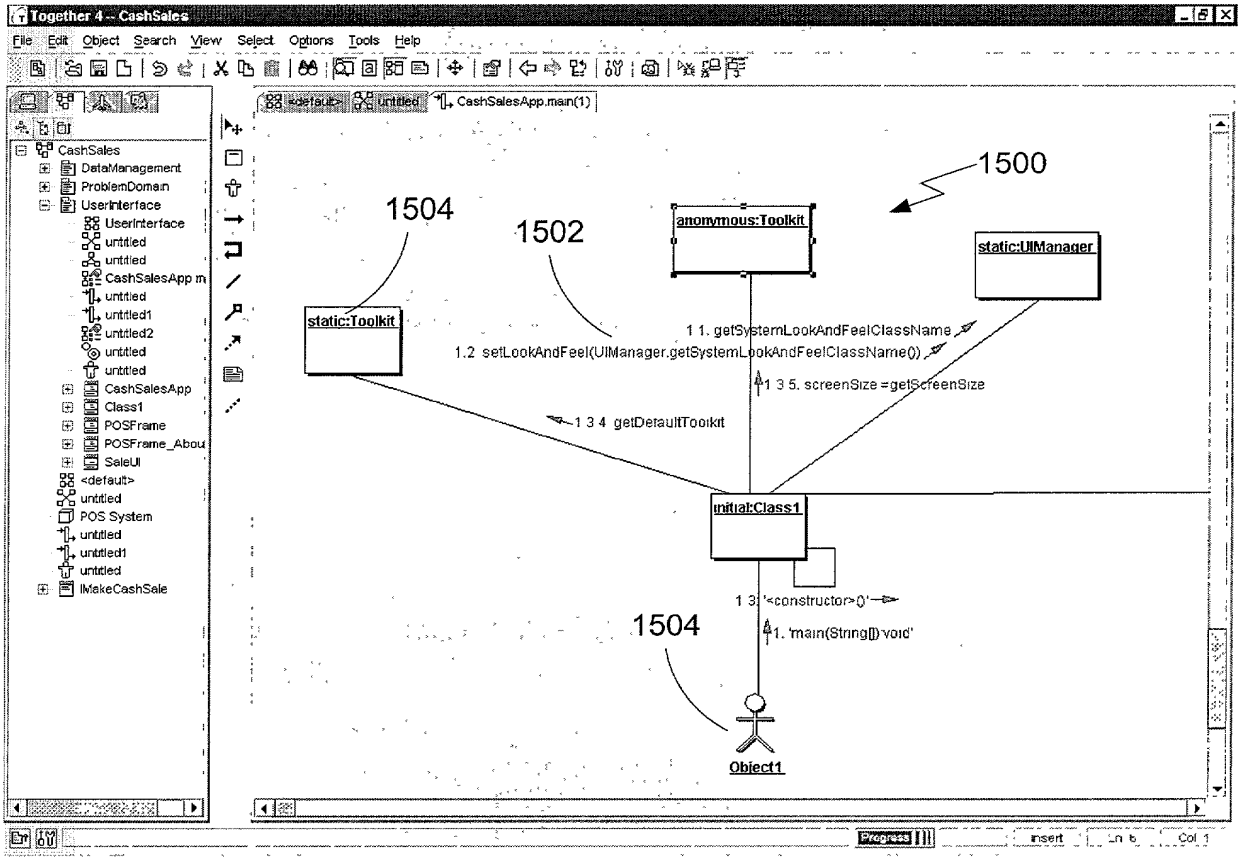

Together 4 -- CashSales
File Edit Object Search View Select Options Tools Help
CashSales
DataManagement
ProblemDomain
UserInterface
UserInterface
untitled
untitled
CashSalesApp m
untitled
untitled1
untitled2
untitled
untitled
CashSalesApp
Class1
POSFrame
POSFrame_Abou
SaleUI
<default>
untitled
POS System
untitled
untitled1
untitled
IMakeCashSale
<default>
untitled
CashSalesApp.main(1)
1500
1504
1502
anonymous:Toolkit
static:UIManager
static:Toolkit
1 1. getSystemLookAndFeelClassName
1.2 setLookAndFeel(UIManager.getSystemLookAndFeelClassName())
1 3 5. screenSize =getScreenSize
1 3 4 getDefaultToolkit
initial:Class1
1 3 '<constructor>()'
1. 'main(String[]):void'
1504
Object1
Progress
Insert
Ln 6
Col 1

FIG. 15

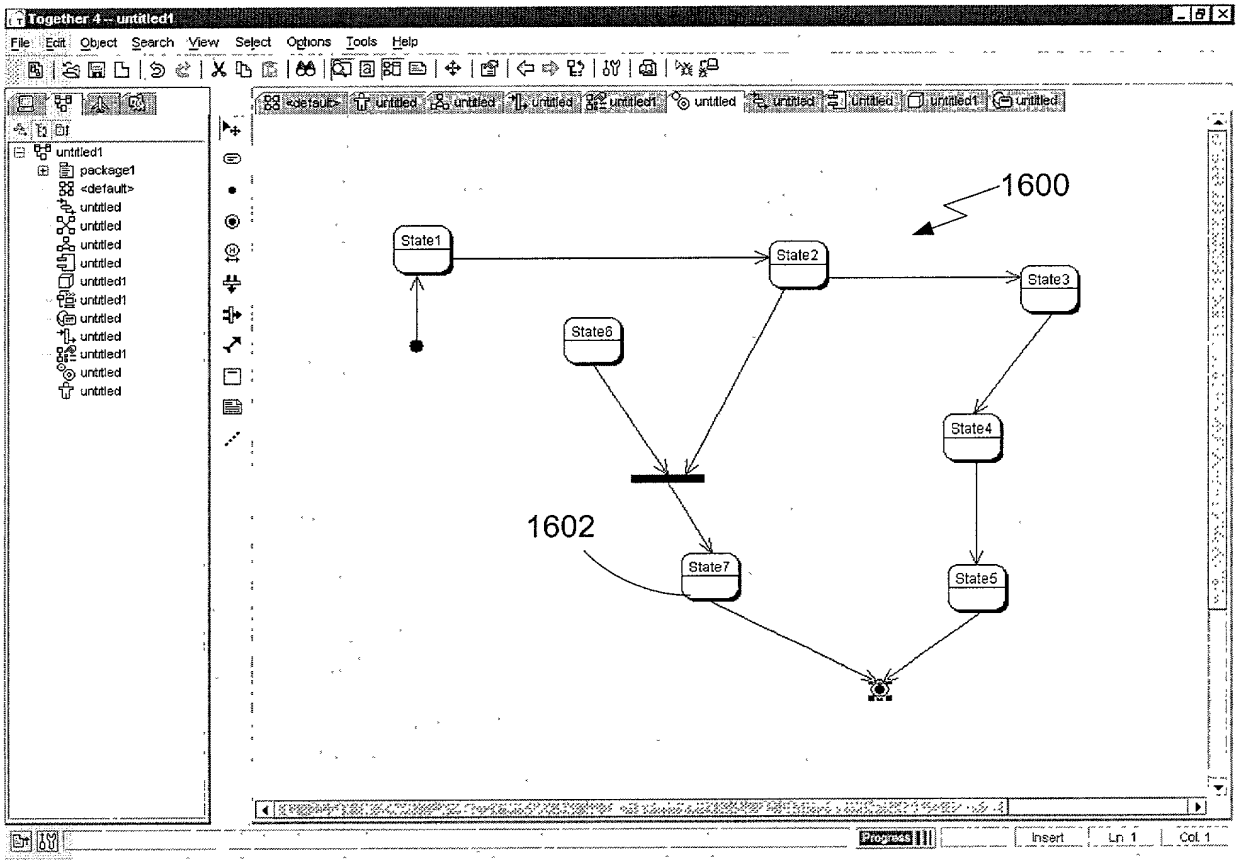

Together 4 -- untitled1
File Edit Object Search View Select Options Tools Help
untitled1
package1
<default>
1600
State1
State2
State3
State4
State5
State6
State7
1602
Insert
Ln 1
Col 1

FIG. 16

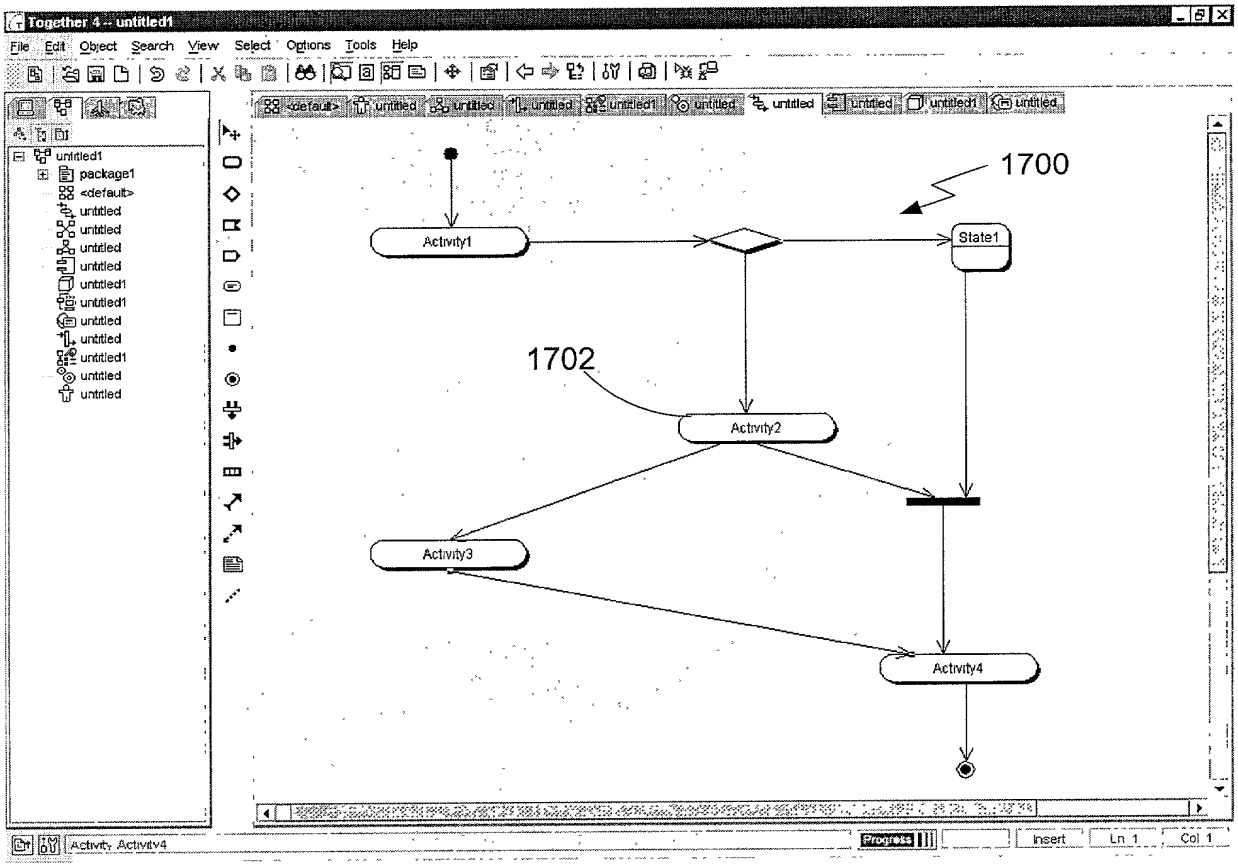

Together 4 -- untitled1
File Edit Object Search View Select Options Tools Help
untitled1
package1
<default>
1700
Activity1
State1
1702
Activity2
Activity3
Activity4
Activity: Activity4
Insert
Ln 1
Col 1

FIG. 17

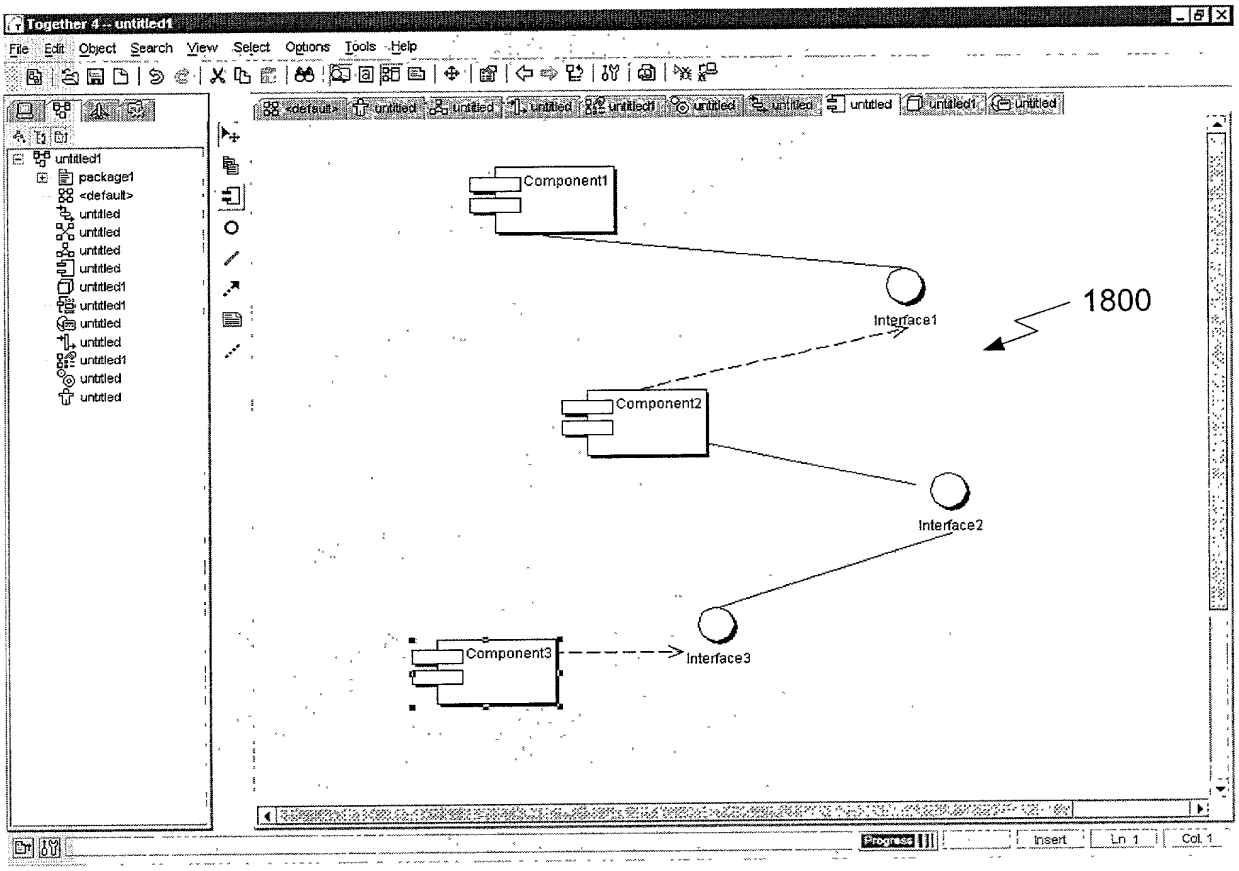

Together 4 -- untitled1
File Edit Object Search View Select Options Tools Help
untitled1
package1
<default>
untitled
untitled
untitled
untitled
untitled1
untitled1
untitled
untitled
untitled1
untitled
untitled
Component1
Interface1
1800
Component2
Interface2
Component3
Interface3
Insert
Ln 1
Col 1

FIG. 18

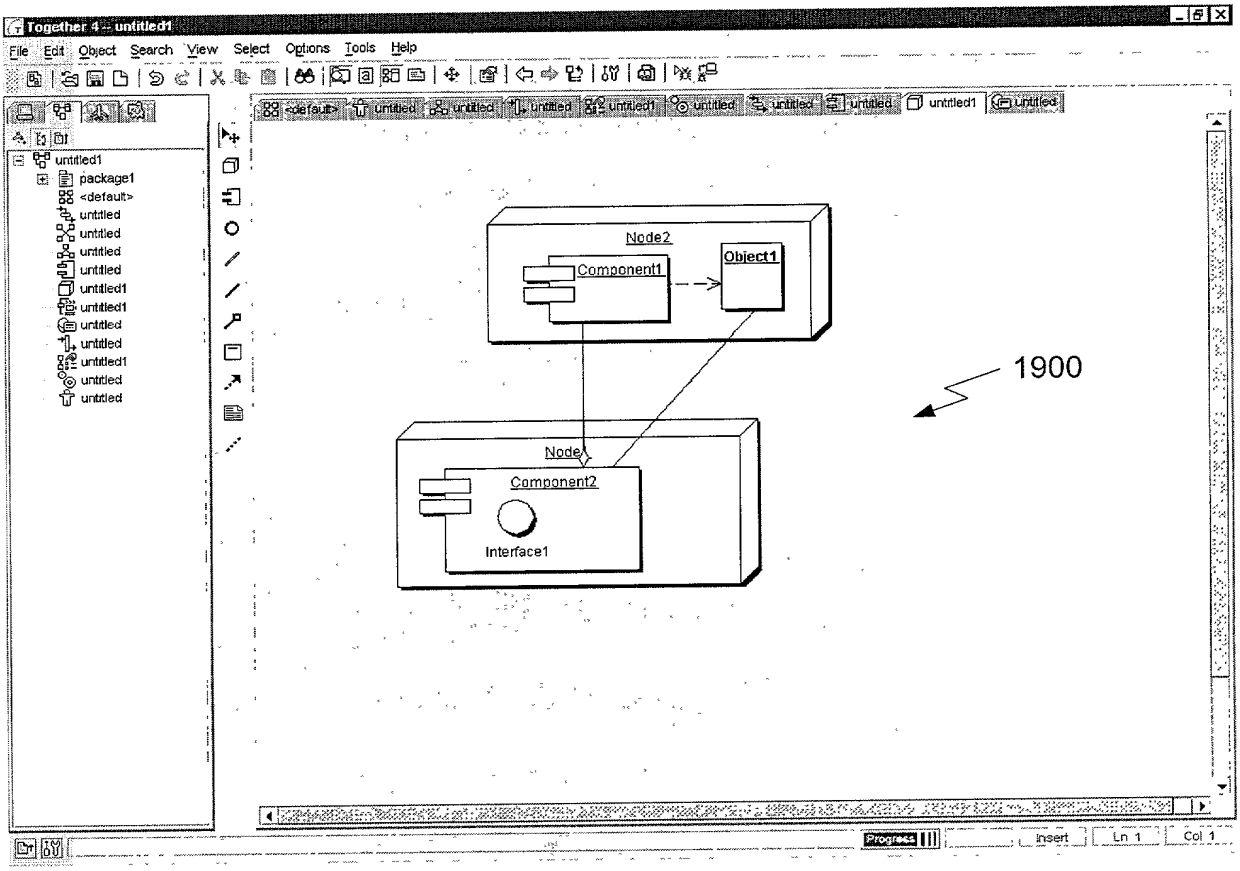

Together 1 - untitled1
File Edit Object Search View Select Options Tools Help
untitled1
package1
<default>
Node2
Component1
Object1
Node
Component2
Interface1
1900
Insert
Ln 1
Col 1

FIG. 19

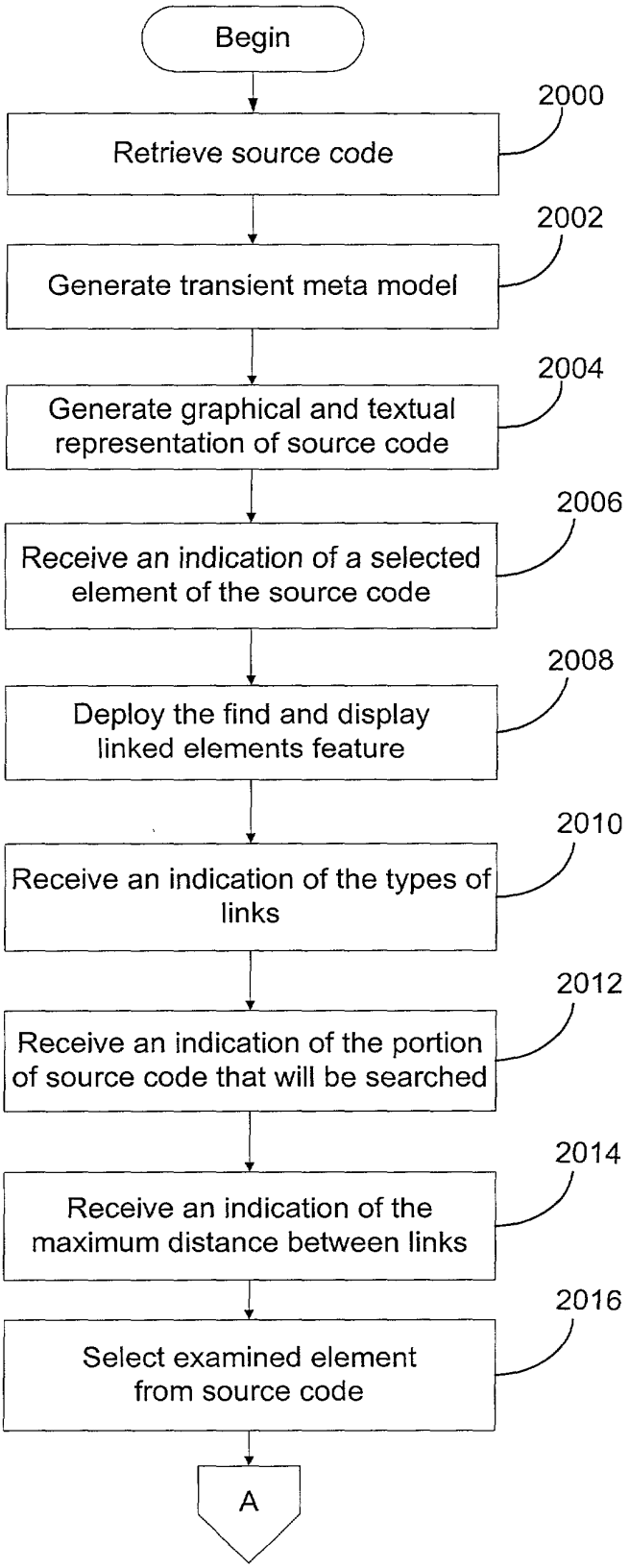

Begin
2000
Retrieve source code
2002
Generate transient meta model
2004
Generate graphical and textual representation of source code
2006
Receive an indication of a selected element of the source code
2008
Deploy the find and display linked elements feature
2010
Receive an indication of the types of links
2012
Receive an indication of the portion of source code that will be searched
2014
Receive an indication of the maximum distance between links
2016
Select examined element from source code
A

FIG. 20A

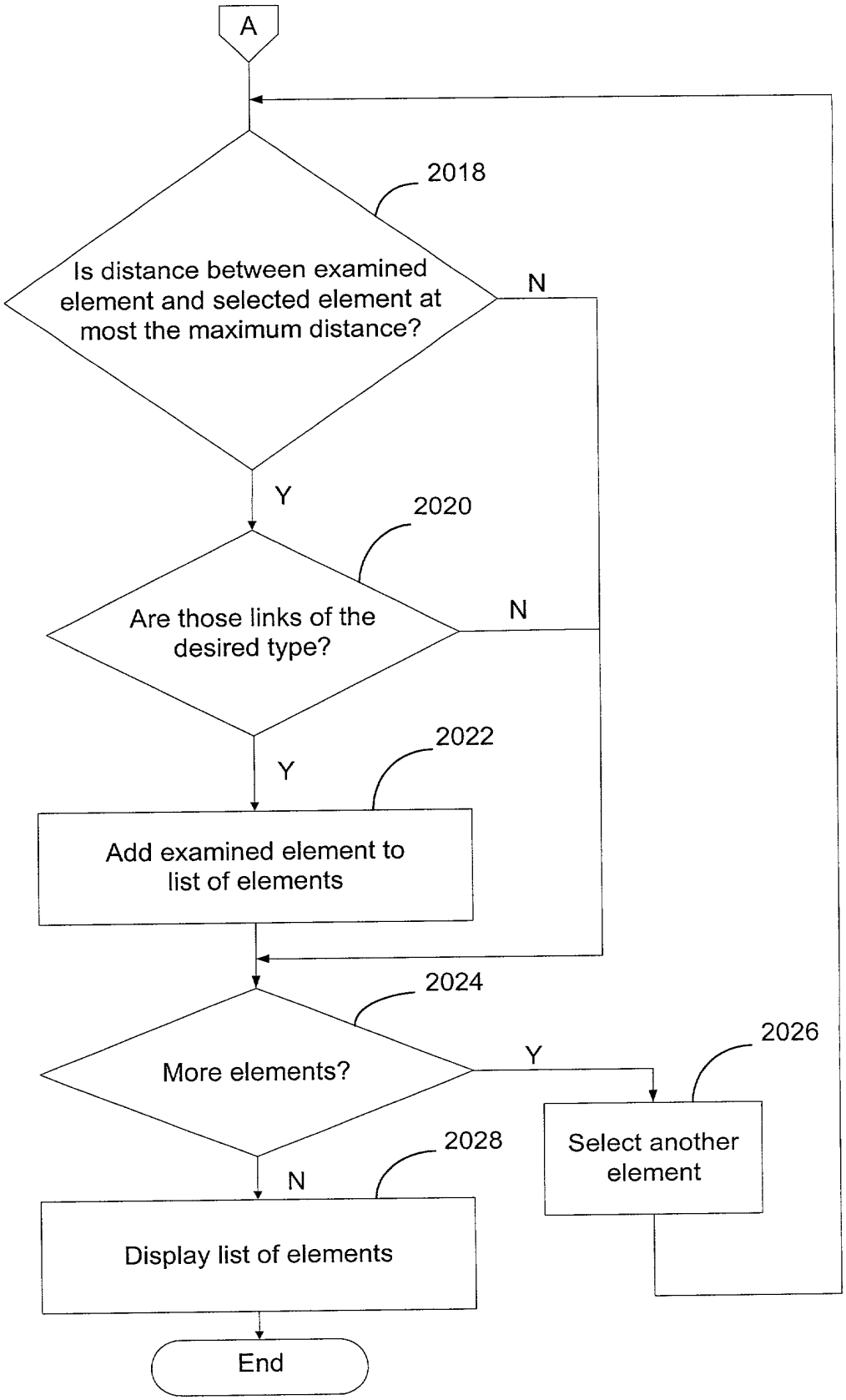

A
2018
Is distance between examined element and selected element at most the maximum distance?
N
Y
2020
Are those links of the desired type?
N
Y
2022
Add examined element to list of elements
2024
More elements?
Y
2026
Select another element
N
2028
Display list of elements
End

FIG. 20B

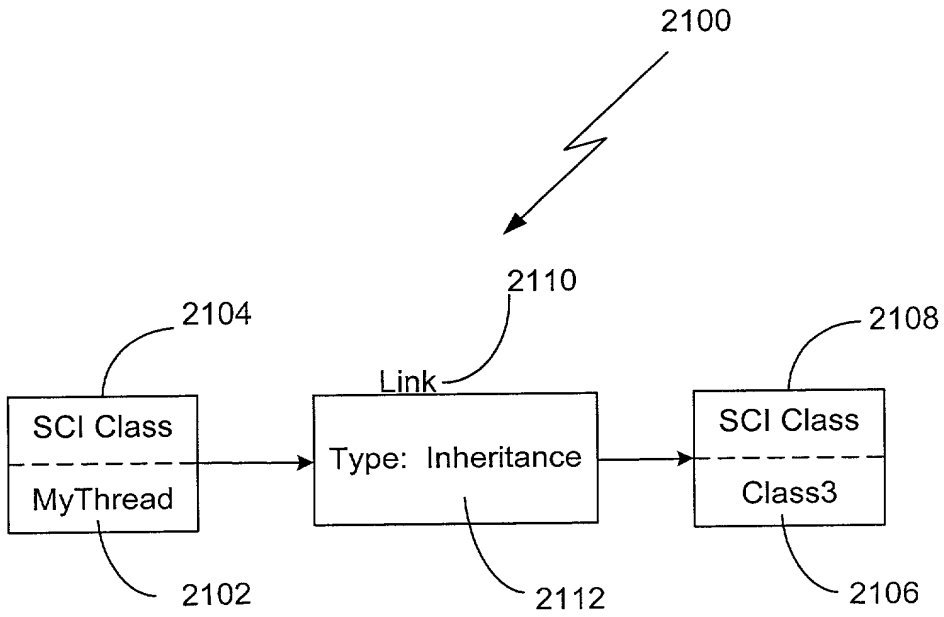
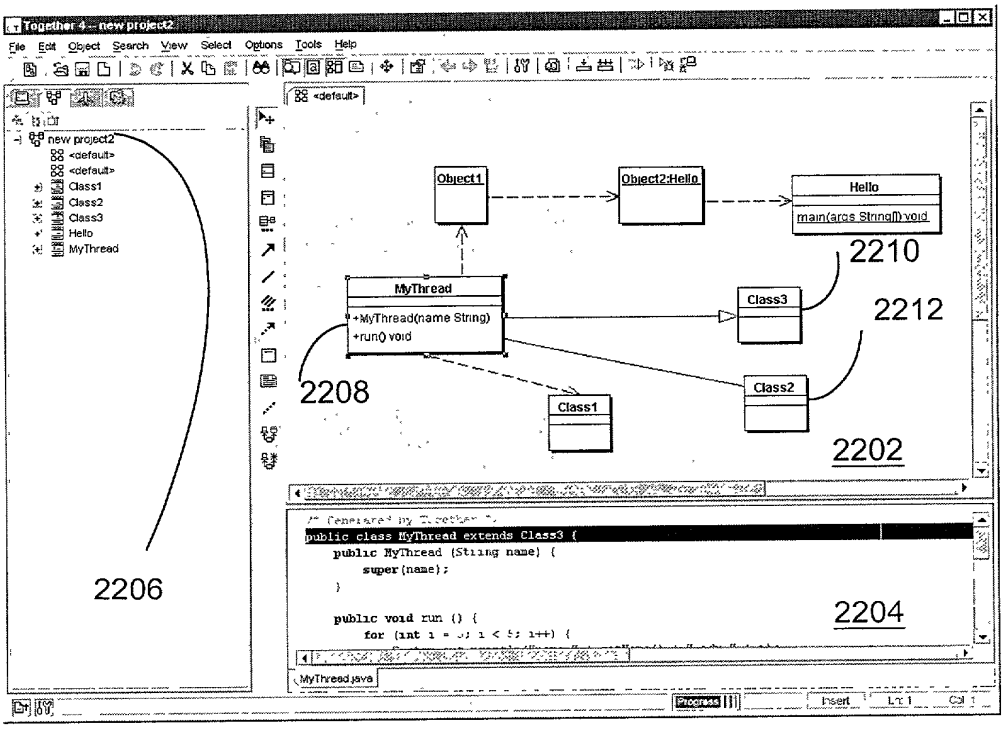

2100
2110
2104
2108
Link
SCI Class
MyThread
Type: Inheritance
SCI Class
Class3
2102
2112
2106

FIG. 21


Together 4 -- new project2
File Edit Object Search View Select Options Tools Help
new project2
<default>
<default>
Class1
Class2
Class3
Hello
MyThread
<default>
Object1
Object2:Hello
Hello
main(args String[]):void
2210
MyThread
+MyThread(name String)
+run() void
Class3
2212
2208
Class2
Class1
2202
public class MyThread extends Class3 {
public MyThread (String name) {
super(name);
}
public void run () {
for (int i = 0; i < 5; i++) {
2204
MyThread.java
Insert
2206

2200

FIG. 22

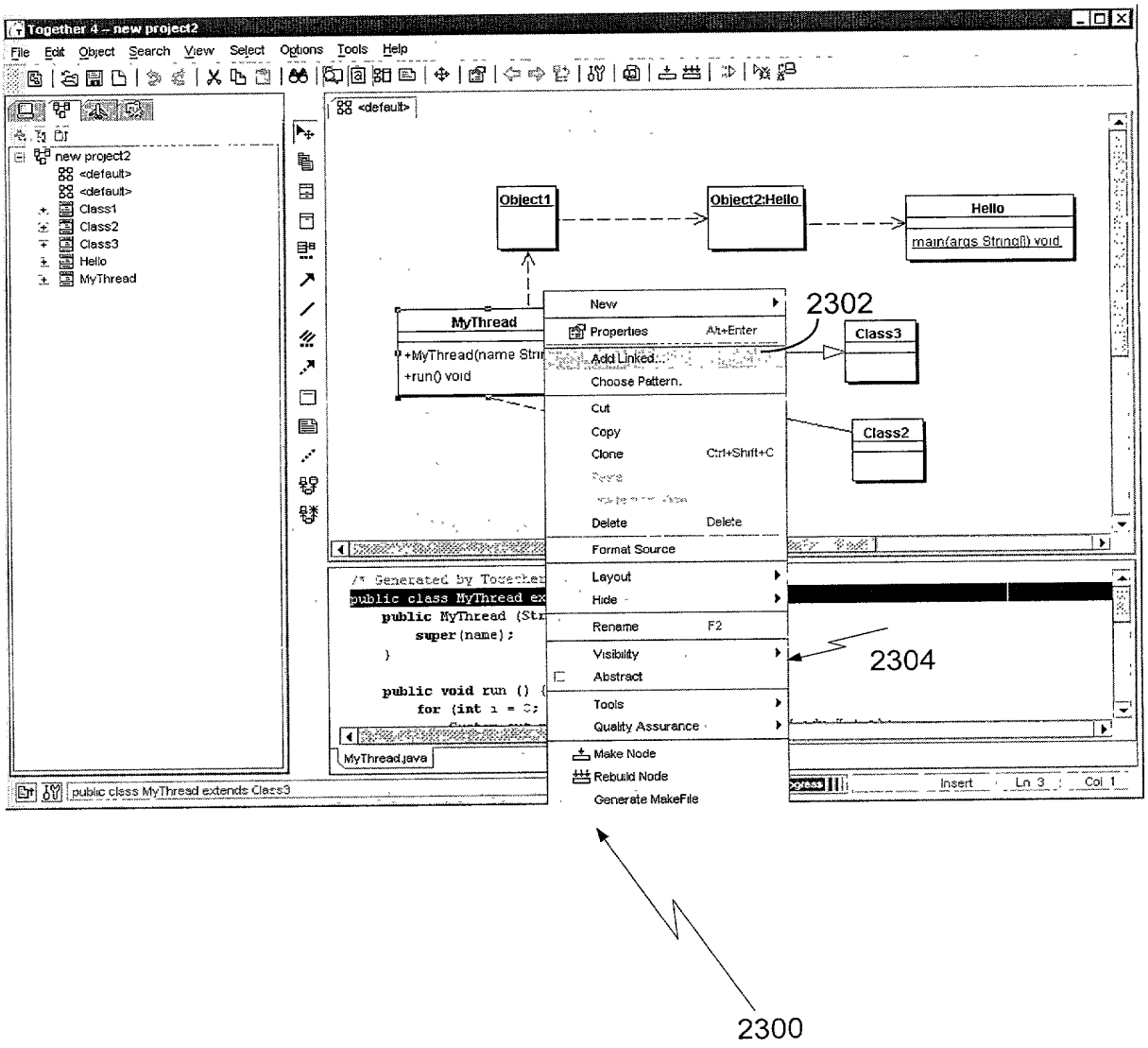

Together 4 – new project2
File Edit Object Search View Select Options Tools Help
new project2
<default>
<default>
Class1
Class2
Class3
Hello
MyThread
<default>
Object1
Object2:Hello
Hello
main(args String[]) void
MyThread
+MyThread(name Str
+run() void
New
Properties Alt+Enter
Add Linked...
Choose Pattern...
Cut
Copy
Clone Ctrl+Shift+C
Delete Delete
Format Source
Layout
Hide
Rename F2
Visibility
Abstract
Tools
Quality Assurance
Make Node
Rebuild Node
Generate MakeFile
Class3
Class2
2302
2304
2300
MyThread.java
public class MyThread extends Class3
Insert
Ln 3
Col 1

FIG. 23

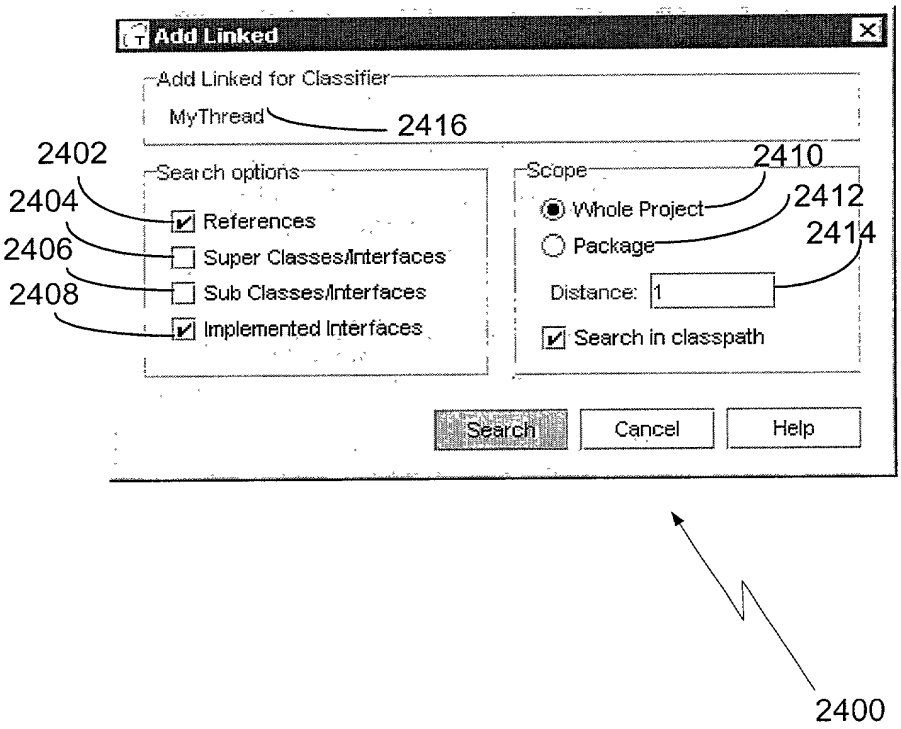

Add Linked
Add Linked for Classifier
MyThread
2416
2402
Search options
2404
References
2406
Super Classes/Interfaces
2408
Sub Classes/Interfaces
Implemented Interfaces
2410
Scope
Whole Project
2412
Package
2414
Distance: 1
Search in classpath
Search
Cancel
Help
2400

FIG. 24

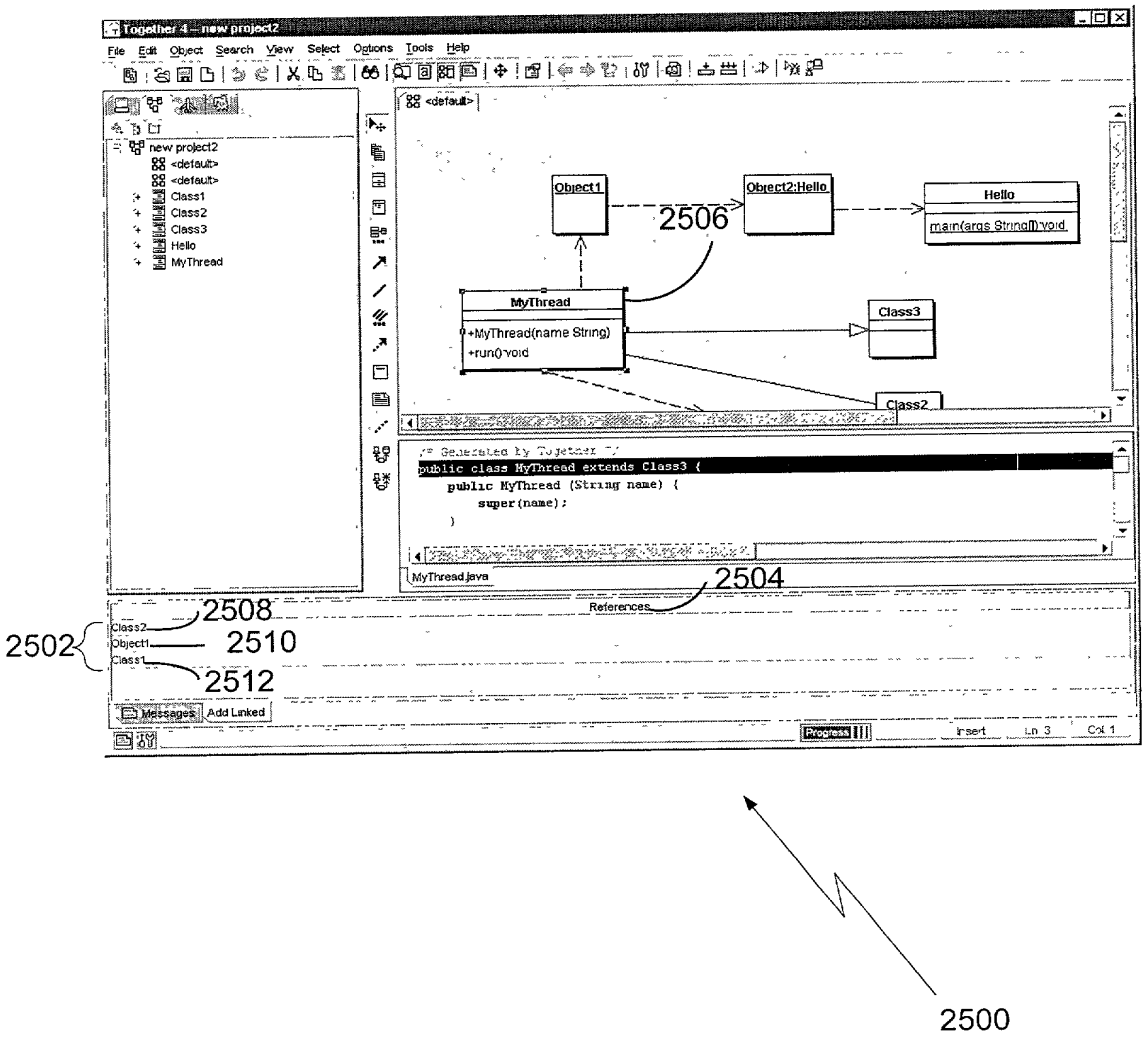

Together 4 – new project2
File Edit Object Search View Select Options Tools Help
new project2
<default>
<default>
Class1
Class2
Class3
Hello
MyThread
<default>
Object1
Object2:Hello
Hello
main(args String[]):void
2506
MyThread
+MyThread(name String)
+run():void
Class3
Class2
public class MyThread extends Class3 {
public MyThread (String name) {
super(name);
}
MyThread.java
References
2504
2508
2502
Class2
Object1
Class1
2510
2512
Messages
Add Linked
Progress
Insert
Ln 3
Col 1
2500

FIG. 25

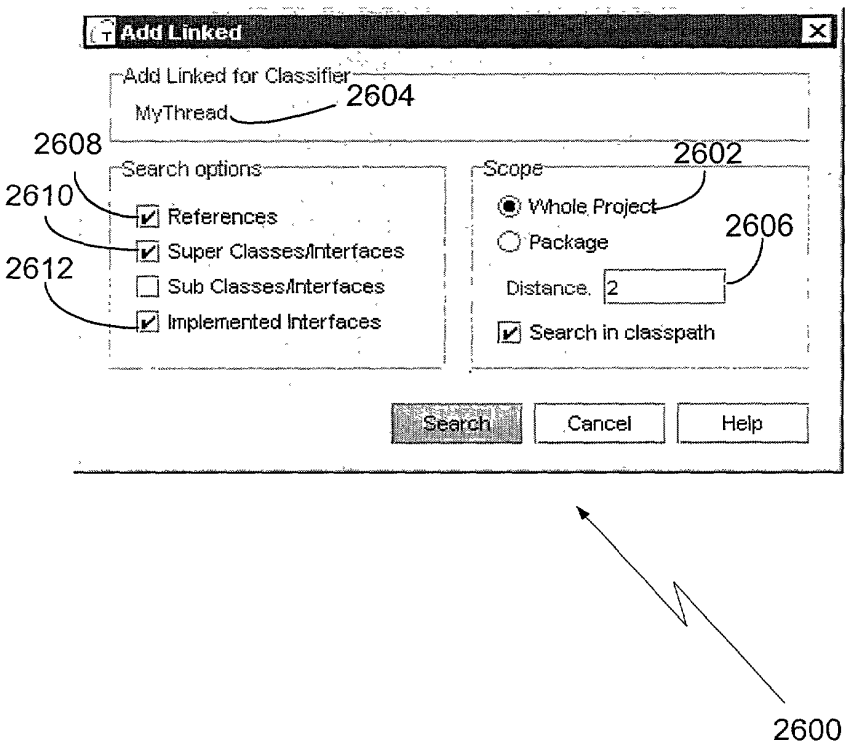

Add Linked
Add Linked for Classifier
MyThread
2604
2608
2610
2612
Search options
References
Super Classes/Interfaces
Sub Classes/Interfaces
Implemented Interfaces
2602
Scope
Whole Project
Package
2606
Distance. 2
Search in classpath
Search
Cancel
Help
2600

FIG. 26

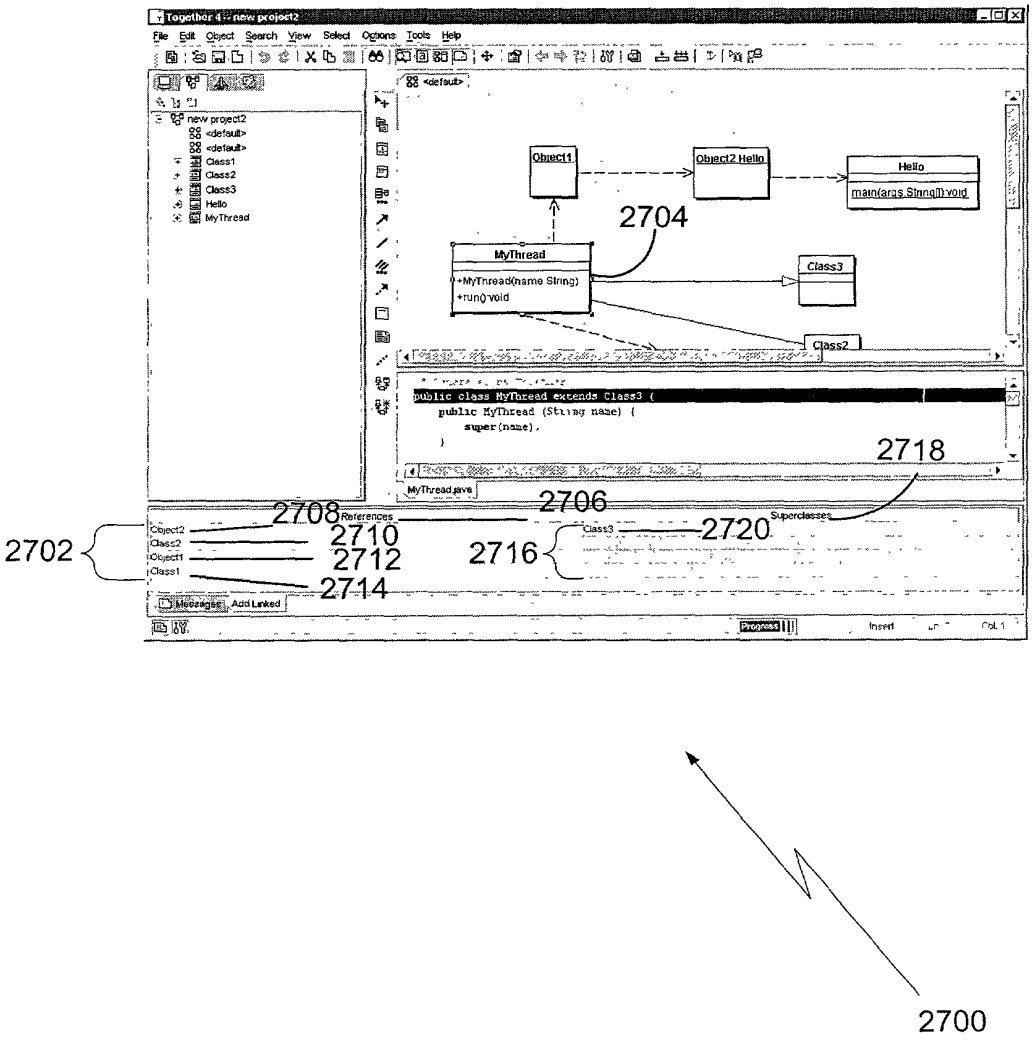

Together 4 - new project2
File Edit Object Search View Select Options Tools Help
new project2
<default>
<default>
Class1
Class2
Class3
Hello
MyThread
<default>
Object1
Object2 Hello
Hello
main(args String[]):void
2704
MyThread
+MyThread(name String)
+run():void
Class3
Class2
public class MyThread extends Class3 {
public MyThread (String name) {
super(name);
}
2718
MyThread.java
2708
References
2706
Superclasses
Object2
Class2
Object1
Class1
2710
2712
2714
2702
2716
Class3
2720
Messages
Add Linked
Progress
Insert
Col 1
2700

FIG. 27